DIXON (S.G.)

A BACTERIOLOGICAL MANIPULATING CHAMBER.

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THE apparatus about to be described is adapted to retain to a reasonable degree a sterilized working space during the manipulations requisite for the cultivations, etc., of bacteria.

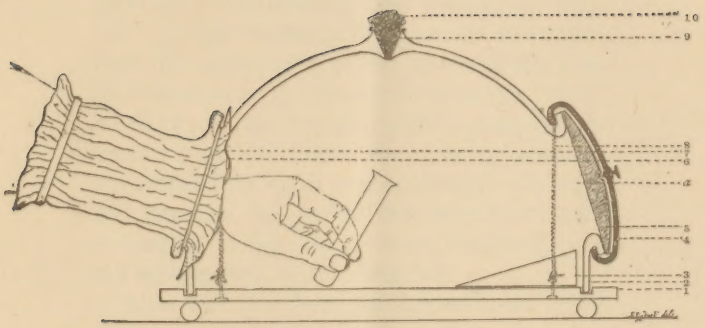
To use the manipulating chamber—for example, to inoculate a number of test-tubes—the operator proceeds as follows: The tubes to be inoculated, filled with the requisite quantity of nutrient gelatin or agar-agar and plugged with sterilized cotton, are placed in the chamber in wire baskets or on the rack (No. 3), together with needles, slides, cover-glasses, etc., and the lids (No. 5) securely clamped over the apertures *a*. The ventilating aperture at the top of the chamber should be filled with cotton to allow the free exit and entrance of uncontaminated air as the apparatus is heated and cooled. Or, if desired, a small thermometer may be introduced through this opening, and the cotton packed around it. The whole is then sterilized in a hot-air sterilizer, taking care to

have the temperature in the interior of the chamber sufficiently high to destroy all spores as well as bacteria, or else to reheat the chamber on two or more days.

After cooling, and immediately upon the removal of the apparatus from the hot-air sterilizer, the cords (No. 8) are passed over the necks of the apertures (*a*), and fastened to the bed-plate to prevent the cover from being accidentally lifted from the latter at any time during the manipulations. If necessary, a little oil or paraffine can be poured into the groove in the bed-plate.

The rubber sleeves (No. 6) are thoroughly washed, inside and out, first in soap and water, then in bichloride of mercury solution, and, while still wet with the latter, are slipped over the hands and arms of the operator, these also having been thoroughly washed and disinfected, until the fingers reach to the farther ends of the sleeves. Great care must be observed not to admit air into the sleeves. The thick rubber bands favor this exclusion of outside air by closely adapting themselves to the varying contour of the fingers, hands, and arms.

The right-hand glass cap is then washed and disinfected, the lower end of the corresponding sleeve is firmly pressed against this cap, and the fingers stretch the band over the lips of the aperture and allow it to contract around the neck of the same. Then the clamp is unscrewed, and lid and clamp are permitted to drop into the sleeve beside the operator's arm. The hand has now free access to the sterilized chamber. The left hand is conducted into the chamber in a like man-



No. 1 represents an iron plate, grooved on top to receive No. 2.

No. 2. A round glass cover, sixteen inches in diameter and ten inches high.

No. 3. A rack for instruments, test-tubes, etc., preferably made of glass.

a. A round aperture about four inches in diameter. (The lips at the margin of this opening and of its fellow opposite must be ground perfectly flat.)

No. 4. Iron clamp with thumb-screw, to hold in place No. 5.

No. 5. A glass cap or lid made with one flat ground surface to fit on ground surface of lips around the aperture *a*.

No. 6. Thin rubber sleeves twelve inches long and eight inches in diameter.

No. 7. Thick rubber bands.

No. 8. A cord stretched over the neck of "*a*" and hooked down to the bed-plate (No. 1).

No. 9. An aperture to receive a thermometer or No. "10."

No. 10. A cone-shaped sterilized cotton plug.

ner, carrying with it the tube containing the culture for inoculation. In order that this last tube may be thoroughly sterile as to its exterior, a well-washed and disinfected rubber cap (an ordinary finger-stall) is slipped over the cotton plug of the tube, and the tube then washed in the bichloride solution. Now, when the rubber cap and cotton plug are removed from the tube in the chamber, the cap, by contracting upon and enclosing the plug, will prevent any germs that may have been entangled in the cotton from escaping into the atmosphere of the chamber.

After both hands of the operator are in the chamber, they can be dried, if necessary, on a little absorbent cotton, placed for the purpose on the floor of the chamber. The cap and plug are then slipped from the tube containing the growth, the sterilized tubes taken up one after another, inoculated, plugged, and laid aside, slides prepared and cover-glasses adjusted, just as is ordinarily done in the laboratory.

When all the desired work is accomplished, the hands are removed, the cords unfastened, the glass cover lifted from the bed-plate, and the inoculated tubes and slides stored away or placed in an incubator, as the operator desires.

In the same manner plate cultivations may be made. In fact, all chambers for plate or potato cultivation should be made on this or a similar plan, inasmuch as the large area of the plates or potatoes greatly increases the danger of contamination while they are being prepared and inoculated.

Cover-glass impressions may be made from

time to time from the same plate. Or, with such an apparatus, a microscope may be inserted through one of the arm-apertures, the objective and eye-piece removed, a cotton plug placed in the draw-tube, and the space around the microscope in the aperture packed with cotton, the whole sterilized by heating, a plate cultivation made on a slide, the objective washed in a solution of carbolic and lactic acid and applied, the eye-piece inserted, and the same growth observed from time to time. Yes, it may even be photographed at any period of its development, or many times, by means of the appliance for making photo-micrographs with the microscope in the upright position devised by Dr. Seneca Egbert, of this city, and described by him in *The Microscope* for October, 1888.

Again, small organs or animals may be dissected, living ones inoculated, and any of the ordinary bacteriological operations performed with the minimum of danger of contamination.

The above manipulations may seem tedious or complicated, but are in reality very simple, and will take far less time than is here necessary to describe them. And, if we are to believe that there are micro-organisms, many or few, contaminating the air of our laboratories, the use of such appliances is certainly a step towards scientific accuracy, and the results thus obtained must be *the more valuable* as they are *the more accurate*.